United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503) 231-6179 FAX: (503) 231-6195

March 11, 2013

The Wildlife Society
5410 Grosvenor Lane, Suite 200,
Bethesda, MD, 20814

Dear Awards Committee:

We would like to nominate Dr. Nathan Schumaker for the 2013 Special Recognition Service Award. Dr. Schumaker's work on developing the HexSim population modeling software has been instrumental in our development of the Final Critical Habitat Rule for the Northern Spotted Owl. More importantly, HexSim is freely available to anyone who wants to use it, and Dr. Schumaker's willingness to assist a diverse group of users with applications has been invaluable.

Sincerely,

Paul Henson, Ph.D
State Supervisor

cc: Jeffery Dunk
Brian Woodbridge
Betsy Glenn

Nomination Package for The Wildlife Society – Special Recognition Service Award

Nominee's Full Name:

Dr. Nathan H. Schumaker
Office of Research and Development
National Health & Environmental Effects Research Laboratory
200 SW 35th St.
Corvallis OR 97333
Phone: 541-754-4658
Email: schumaker.nathan@epa.gov

Current Positions:

1. Research Ecologist U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Western Ecology Division, Corvallis, Oregon.

2. Courtesy Assistant Professor, College of the Environment, The University of Washington, Seattle, WA.

3. Courtesy / Affiliate Assistant Professor, Department of Fisheries & Wildlife, Oregon State University, Corvallis, OR.

Nominator Name and Contact Information:

Paul Henson
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Endorser's Names and Contact Information:

Jeffrey R. Dunk
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Brian Woodbridge
Supervisory Wildlife Biologist
US Fish and Wildlife Service
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Betsy Glenn
Northern Spotted Owl Specialist
US Fish and Wildlife Service
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Nomination Statement for Nathan Schumaker for *The Wildlife Society – Special Recognition Service Award – 2013*

Nathan Schumaker is a research ecologist at the U.S. Environmental Protection Agency in Corvallis, Oregon. He specializes in simulation model development and applications, landscape ecology, and conservation biology. As part of his research, Dr. Schumaker developed the PATCH and HexSim simulation models, which have been used in viability assessments for many terrestrial wildlife populations. His current research projects include the study of stressor interactions, disease ecology, source-sink dynamics, habitat connectivity, and landscape genetics. We are nominating Nathan for the Special Recognition Service Award for 2013 because his work on the Hexsim model and his willingness to assist us in using it were instrumental in allowing us to develop the Final Revised Critical Habitat Rule for the Northern Spotted Owl (77 FR 71876, FWS–R1–ES–2011–0112, December 4, 2012). Nathan's dedication and willingness to assist us in applying HexSim to this task has proven invaluable in this effort. Furthermore, the software packages are free to all users and his efforts to work with and assist users of these packages has facilitated advances in a wide range of applications.

Over the past decade, Nathan's work on model development has included development of both the PATCH and HexSim software packages. PATCH is a spatially explicit, individual-based, life history simulator designed to project populations of territorial terrestrial vertebrate species through time. PATCH was developed for investigations involving wildlife species that are mobile habitat specialists. It uses habitat maps, specifications for habitat use (territory size and habitat affinity), vital rates (survival and reproduction), and descriptions of a species' movement behavior. PATCH's outputs fall into two general categories: pattern-based metrics and demographic analyses. Pattern-based outputs include patch-by-patch descriptions of landscapes, assessments of the number, quality, and spatial orientation of breeding sites, and map-based estimates of the occupancy rate and the source-sink behavior of breeding habitat. PATCH's principal demographic outputs include several measures of population size as a function of time, realized survival and fecundity rates, and assessments of the occupancy rate and source-sink behavior of the breeding sites present in a landscape.

PATCH had some limitations. It was a single-population females-only model whose individuals were all identical. It had a modern but cumbersome interface, and it could not capture stressor interactions. These limitations compromised the model's realism and utility. More recently, Dr. Schumaker and collaborators improved PATCH to produce a powerful new forecasting tool, HexSim. In constructing HexSim from PATCH, they relaxed a number of constraints. HexSim is a true multi-population and multi-stressor program. In addition, HexSim's populations are trait-based, which means individuals can have unique and dynamic properties. Traits can be genetic, probabilistic, or experiential in nature, and they can influence individual vital rates and behaviors. Users define the model structure, complexity, and data needs. Every

HexSim function can be accessed through a sophisticated graphical user interface. HexSim makes use of spatial data sets to capture landscape structure, habitat quality, stressor distribution, and other types of information and the program's design makes it ideal for exploring the cumulative impacts to wildlife populations resulting from multiple interacting stressors. For development of the Northern Spotted Owl Critical Habitat Rule, HexSim enabled us to simulate and compare owl population performance across a range of critical habitat network designs while incorporating the most up-to-date demographic data available for spotted owls, effects of barred owls, and changes in habitat conditions over time. HexSim is a tremendous tool for wildlife biologists because it allows for an integration of large amounts of information, it is relatively easy to use, and it facilitates an evaluation of both currently-estimated conditions and potential future responses of a species to climate change, management-related actions, habitat restoration or removal, etc. Important conservation questions such as how to allocate (in space and time) limited resources to habitat restoration, invasive species removal, reintroduction strategies, etc. can be addressed in HexSim prior to implementation with the goal being to maximize the positive effects of such actions.

As the following list of recent presentations, workshops, and collaborations indicates, Dr. Schumaker has worked tirelessly with users of these models to insure their applicability for a wide range of species and research goals. For such efforts, we believe that Nathan Schumaker is highly deserving of the 2013 Special Recognition Service Award.

Recent Presentations:

10/2012 JR Dunk, B. Woodbridge, N. H. Shumaker, E. M. Glenn, D. LaPlante, and B. White. 2012. Integrating distributional, spatial prioritization, and individual-based models to evaluate potential critical habitat networks: A case study using the northern spotted owl. The Wildlife Society Annual Meeting, Portland, Oregon.

10/2012 B Woodbridge., E. M. Glenn, J. R. Dunk, N. H. Shumaker, D. LaPlante, and B. White. 2012. Reconciling conservation planning with the Endangered Species Act: A case study using the northern spotted owl. The Wildlife Society Annual Meeting, Portland, Oregon.

9/2012 JR Dunk, B. Woodbridge, N. H. Shumaker, E. M. Glenn, D. LaPlante, and B. White. 2012. Using spatially-explicit individual-based population models to evaluate alternative habitat networks: A case study with the northern spotted owl. Humboldt State University Biodiversity Conference, Arcata, California.

8/2012 NH Schumaker, A Brookes, C. Carroll, T. Nogeire, P. Singleton, M. Tuma, C. Wilsey, and Y. Xie. Using HexSim to simulate complex species, landscape, and stressor interactions. Ecological Society of America Annual Meeting. Portland, Oregon.

8/2012 Author / Co-author on 10 talks at the Ecological Society of America Annual Meeting, in Portland, OR (in addition to the talk above).

12/2011 NH Schumaker, A Brookes, JA Heinrichs. Landscape Connectivity, Source-Sink Dynamics, and Population Viability. Society for Conservation Biology Annual Meeting. Auckland, New Zealand.

12/2011 JJ Lawler, NH Schumaker, CB Wilsey, BB Bancroft. Simulating the Effects of Multiple Stressors on At-Risk Populations. SERDP Annual Symposium. Washington DC.

11/2011 A Brookes, NH Schumaker. 2011. Modeling Wildlife Populations with HexSim. The Wildlife Society Annual Meeting, Waikoloa, HI.

9/2011 K McNyset, J Falke, C Jordan, A Brookes, NH Schumaker. A spatially and temporally explicit, individual-based, life-history and productivity modeling approach for aquatic species. American Fisheries Society Annual Meeting. Seattle, Washington.

4/2011 JJ Lawler, BA Bancroft, NH Schumaker. Potential population-level effects of land-use change on an endangered bird. International Association for Landscape Ecology Annual Meeting. Portland, Oregon.

4/2011 C Wilsey, JJ Lawler, NH Schumaker, B Bancroft, D. Cimprich. Cumulative effects of cowbird management, military training, and climate-driven changes in fire on the Black-capped Vireo. International Association for Landscape Ecology Annual Meeting. Portland, Oregon.

Recent Workshops:
7/2013 Organized and led a 1/2 day workshop on the use of the HexSim model at The Society for Conservation Biology's annual meeting in Baltimore, MD.

11/2012 Traveled to the University of Adelaide, AU, to work on the development of simulation models for endangered species (invited international travel).

11/2012 Traveled to Perth, AU to work with the Australian Department of Environment and Conservation on the development of simulation models for endangered species (invited international travel).

11/2012 Member of the Australian Center for Ecological Analysis and Synthesis (ACEAS), Molecules in Models working group on landscape genetics (invited international travel). Brisbane, Australia.

5/2012 Attended NSF-sponsored workshop titled Using metamodels to enable transdisciplinary research for the study of dynamic biological systems under global change. Hosted by the Brookkfield Zoo, Brookfield, IL.

Recent Committees, Appointments, and Collaborations:
2013 - Present Member of a US. Fish and Wildlife Service team developing reserve strategies for species of conservation concern in Oregon's Willamette Valley.

2012 - Present Worked with a group at the University of Adelaide (in Adelaide, Australia) on the population viability analysis for the Australian long-necked turtle.

2012 - Present Contributed to the development of conservation plans for multiple species of concern in a collaboration with the Australian Dept. of Environment and Conservation, Perth, Australia.

2010 - 2013 Developed the population modeling component of the Obama administration's Spotted Owl Recovery plan for the US Fish and Wildlife Service.

2008 - Present Provide yearly lectures and laboratory instruction for an undergraduate / graduate landscape ecology class at the University of Washington College of the Environment.

2007 - Present Developed the first Ord's Kangaroo Rat PVA in collaboration with Scientists from the Canadian Wildlife Service.

2007 - Present Contributed to the US Fish and Wildlife Services' 2008 Final Recovery Plan for the Northern Spotted Owl through collaborations.

Recent Peer-reviewed Journal Articles

BG Marcot, MG Raphael, NH Schumaker, and B Galleher. How big and how close? Habitat patch size and spacing to conserve a threatened species. 2012. Natural Resources Modeling. doi: 10.1111/j.1939-7445.2012.00134.x, published online 20 July 2012.

A.V. Stronen, N.H. Schumaker, G.J. Forbes, P.C. Paquet, and R.K. Brook. 2012. Landscape resistance to dispersal: simulating long-term effects of human disturbance on a small and isolated wolf population in southwestern Manitoba, Canada. Environmental Monitoring and Assessment. doi: 10.1007/s10661-011-2469-9, published online 6 December 2011.

J.P. Bolte, R.B. McKane, D.L. Phillips, N.H. Schumaker, D.White, A.Brookes, and D.M. Olszyk. 2011. In Oregon, the EPA Calculates Nature's Worth Now and in the Future. Solutions 2(6) 35-41.

Heinrichs, J.A., D.J. Bender, D.L. Gummer, and N.H. Schumaker. 2010. Assessing critical habitat: Evaluating the relative contribution of habitats to population persistence. Biological Conservation 143:2229-2237.

McRae B., N.H. Schumaker, R.B McKane, R.T. Busing, A.M. Solomon, and C.A. Burdick. 2008. A multi-model framework for simulating wildlife population response to land use and climate change. Ecological Modelling 219:77-91.

Carroll C., M. K. Phillips, C. A. Lopez-Gonzalez, and N. H. Schumaker. 2006. Defining recovery goals and strategies for endangered species: The wolf as a case study. Bioscience 56:25-37.

Jager, H. I., A. W. King, N. H. Schumaker, T. L. Ashwood, and B. L. Jackson. 2005. Spatial uncertainty analysis of population models. Ecological Modeling 185:13-27.

Recent Technical Reports

Contributed to: U.S. Fish and Wildlife Service. 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl. U.S. Fish and Wildlife Service, Portland, Oregon. 790 pp.

Contributed to: U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Northern Spotted Owl (Strix occidentalis caurina). U.S. Fish and Wildlife Service, Portland, Oregon. xvi + 258 pp.

Schumaker, N.H. 2013. HexSim User's Guide (Version 2.4). U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon, USA. <http://www.epa.gov/hexsim>.

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March 13, 2013

The Wildlife Society
5410 Grosvenor Lane, Suite 200,
Bethesda, MD, 20814

Dear Awards Committee:

I enthusiastically endorse this letter in support of Dr. Nathan Schumaker being recognized with the TWS Special Recognition Service Award.

Sincerely,

Betsy Glenn

HUMBOLDT STATE UNIVERSITY

Environmental Science & Management
Environmental Management and Protection Major
Environmental Science Major

12 March 2013

The Wildlife Society Awards Committee

Dear Awards Committee,

I wholeheartedly endorse this letter in support of Dr. Nathan Schumaker being recognized with the TWS Special Recognition Service Award. Nathan's dedication and contributions to applied conservation are tremendous. I believe Nathan to be a very deserving recipient of TWS's Special Recognition Service Award.

Sincerely,

Jeffrey R. Dunk

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1829 South Oregon Street
Yreka, California 96097
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In Reply Refer To:

March 13, 2013

The Wildlife Society Awards Committee

Dear Awards Committee:

I am writing to express my enthusiastic endorsement of Dr. Nathan Schumaker as a recipient of the TWS Special Recognition Service Award. As the Modeling Team leader for recovery planning and designation of Critical Habitat for the northern spotted owl, I can attest to the significance of Nathan's contributions to wildlife conservation. I feel Nathan is an excellent selection for this award.

Thank you for the opportunity to provide this input.

Sincerely,

Brian Woodbridge
Yreka Fish and Wildlife Office